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ABSTRACTS OF TUBERCULOSIS

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Psychoneurotics and Functional Disorders.—One is puzzled trying to understand the troubles of a large group of patients seen commonly in certain large clinics. They usually expect some sort of surgical miracle, while the average doctor is apt to dismiss them as "merely neurotic." Among their most trying symptoms are a feeling of fatigue, discouragement, inadequacy and discomfort in the head. Several practical questions ought to be asked them, but they seldom are asked. If they have not worked for some time, or fear to do so, or cannot face people, one gets a clue to investigate the nervous system rather than some other organ, as the stomach. Also they usually sleep badly. They lack interest in life, and are demoralized. Frequently they have had insane, psychopathic or epileptic relatives. Their heredity or germ-plasm is defective, and the family or relatives will have noted some changed behavior even though in your presence they do not act amiss. The modern physician is badly trained in handling nervous and psychopathic patients. Even if mental behavior is regarded as abnormal, the doctor's mind reverts to foci of infection, the colon, the glands of internal secretion, and what not. A lot of these poor people are futilely operated on repeatedly and always become worse. Do not tinker with such details as teeth, tonsils or hernias in those patients. A prolonged rest-cure should be advised. Not only does this train of symptoms occur in the inadequately equipped under normal conditions, but in the mentally and physically capable under circumstances of strain. What many physicians need is to go through a nervous breakdown themselves. Also, one should never advise operation on a purely X-ray diagnosis. And the term "colitis" should be abandoned unless there is demonstrable ulceration or inflammation. A spastic colon is not a disease and the term is misleading thus applied. Likewise the diagnosis of visceral ptosis is to be avoided and of retroverted uterus. If there is marital discord its treatment will not help. New fears should not be implanted. Physicians too often fail to recognize frank insanity, and surgeons have been shot by such patients after operating on them. Probably more psychopathic persons consult gastroenterologists than any other kind of specialist. Psychic and behavior changes following severe incapacitating illness should also be recognized. The existence of insane or abnormal relatives should always be investigated. Too often people know little about their relatives, especially those dead or divorced. Besides actual insanity, there are equivalents such as cranks, periodic drinkers, mystics, religious fanatics and violent reformers, criminals and blatant politicians. While many are both mental and physical weaklings, others are well built, able and brilliant. Nevertheless, they are inadequate to the strain of life and menaces to civilization. Modern sanitation now prolongs their lives and they are frequently both voters and government wards. Mostly, they are a financial problem because they have little money or resources. Many are lovable characters but they cannot be remade. They go to pieces with excitement or slight change in routine. What financial

resources they have, should be conserved by avoiding useless surgery, as well as useless diagnostic procedures. The history of a broken life is far more valuable than a blood count and a set of X-ray films. Some such patients find their way into tuberculosis sanatoria on the basis of some slightly suggestive finding. Usually they are emotionally unstable. Perhaps the hardest job is to convince these people about the source and nature of their ailments, and tact and sympathy are required. They need to be taught to live within their handicaps and strength.—*What is Wrong with the Patient who Feels Tired, Weak and Toxic? W. C. Alvarez, New England J. M., January 17, 1935, ccxii, 96.*—(*A. P.*)

Tuberculosis Problem.—The fact that a survey of the tuberculosis problem over the past 50 years shows a decline in death- and incidence-rates is instructive, but is likely to breed complacency. Action instead of complacency is called for in a disease that is killing people over four times as fast as traffic and for which people fear treatment more than the disease. We look for early cases and discover the cases found are not early. We seem to be still fascinated by clinical manifestations of disease and make efforts to study the prebreakdown or really early stage. Surgery is not an end in itself, but an expression of failure to cure or alleviate or remove disease by simpler means. We do not know why one person may die at once, another after several years and another survive, all being equally infected. Possibly our definition of an early case is not correct and we must strive to antedate our conception of onset. Simultaneously we must complete our existing scheme by improving after care.—*A General Survey of the Tuberculosis Problem, P. Varrier-Jones, J. State Med., July, 1935, xliii, 392.*—(*L. F. B.*)

Epidemiology of Tuberculosis.—In the epidemiology of tuberculosis, much more attention has been paid thus far to other more obvious factors than to the phenomenon that starts the chain of infection in the first place. The problem of softening of the caseous tubercle may justly be considered the key-problem in tuberculosis. If caseous tubercles did not soften, the disease would be self-limited and would die out with the end of the present cases, except for occasional cases dependent on unusual methods of transmission. The simplicity of facts concerned is indicated by the following brief summary: The lung is infected by tubercle bacilli, cellular and subsequently caseous tubercles are formed, and some of these soften. The softened caseous matter is discharged into the bronchioles and aspirated into other parts of the lung, with the production of new tubercles, some of which in turn soften; or it is coughed into the outside world, where other people may be infected. That is the whole story. [?—*A. K. K.*] The phenomenon of softening of the tubercle has long been recognized, but not commonly identified as a specific pathological process, distinct from caseation. The significance of softening of the caseous tubercle for epidemiology lies in the fact that associated with it is an enormous multiplication of tubercle bacilli. Three types of case may be distinguished in a general way on the basis of the number of bacilli in the regions of softening, namely, a chronic type with a moderate concentration of bacilli in the softening lesions, an intermediate type, and an acute type with vast numbers of bacilli. The fundamental nature of the process of softening is still unknown. It is not equivalent to suppuration. Attempts to put it on an allergic basis have not been entirely successful. The chief objection is the fact that the allergic state, as far as it can be measured by the tuberculin skin reaction, is commonly of low degree in late stages of the disease when softening and resultant excavation are at their height. The softening tubercle should receive more clinical consideration than is at present the case. Successful treatment of tuberculosis by lung collapse owes its favorable outcome as much to prevention of drainage of liquefying tubercles as to the obliteration of large cavities. Lung collapse, improperly applied, particularly with excessive pressure, even when obvious cavities are obliterated, may result unfavorably through expulsion of highly infective liquefying matter into tributary bronchioles. The most appropriate lung collapse, as far as the softening tubercle is concerned, is that which stops motion of the lung and partially or completely obliterates the small bronchiolar outlets from the liquefying masses.—*From Pathology to Epidemiology In Tuberculosis. Softening of the Caseous Tubercle and Its Results, E. R. Long, J. Am. M. Ass., May 25, 1935, civ, 1883.*—(*G. L. L.*)

Intrathoracic Tuberculosis in China.—No previous attempt has been made to give a comprehensive account of this disease among the Chinese or to make full use of the data available. In the present survey three main sources of information were used: (1) statistics from large Chinese centres of population or large groups outside these centres; (2) data from a clinical study of

patients seen at the West China clinics and wards during 1931, 1932 and the first half of 1933; (3) results of a similar survey over a five months' period among hospitalized Chinese in Soochow, Nanking, Hangchow, Hoochow and Shanghai, as well as non-Chinese attending clinics and institutions of the Shanghai Municipal Council. Facilities for the East China survey were provided by the Henry Lester Institute for Medical Research at Shanghai. *Conditions and facilities in West China*: Chingtu, a city of 800,000 people, is the ancient capital and educational centre of the Province of Szechuan, comprising 60 million people, more or less. Because of the disordered state of this province and despite its fertility and rich resources, the bulk of the population has been reduced to a state of penury. Increased means of communication, recently developed, have brought new public-health problems. For instance, cholera has followed the track of the road builders. Congenital abnormalities abound. On the plain there is little or no wind during most of the year and humidity is high, leading to congestion of the nasopharyngeal mucosa. Also, diet is poor in fat-soluble vitamines and in calcium. Medical facilities are scanty, the apparatus requiring a long period of transit, and trained technicians must be brought from Shanghai when necessary. Simple economic and speedy methods of diagnosis and treatment are necessary. As no X-ray plant existed, it became necessary to revalue the significance of simple laboratory procedures, and of symptoms and signs, against the existing background. On the other hand, in the East China investigation all the Shanghai facilities were available and the special resources of the Henry Lester Institute. *Comparative Chinese tuberculosis statistics*: The current impression among medical men in China is that pulmonary tuberculosis ranks high as a major killing disease. The statistics available are mostly from such large centres as Peiping, Shanghai, Hong Kong and the Malay Peninsula. The mortality rates among Chinese from pulmonary tuberculosis for 1930–1932 were: for Peiping 234.4 per 100,000, for Hong Kong 256.2, and for Singapore 287.5. The general mortality is lower for Shanghai and Peiping than for Hong Kong and Singapore, though this must be corrected both on account of undiagnosed exposed corpses of the very young and the fact that many coming to the great cities for work or study prefer to go home to die. Information is also available from the Shanghai Ward Road Gaol, the largest prison in the world, with a total of 45,739 prisoners entering its doors in 1930–1932, for an average stay of five and one-half months. During this period 86 per cent of its general mortality was caused by tuberculosis. Hygienic conditions in the jail are relatively good and overcrowding was not as bad as among the average poor Chinese. For the country as a whole an estimate of 500 per 100,000 may be arrived at as the general mortality rate from pulmonary tuberculosis, this being a very crude estimate. *Problems and methods of investigation*: It is common experience that most patients and physicians visiting tuberculosis clinics do so to have private fears or convictions confirmed. However, one must also be prepared to find other coexistent diseases. As a standard for diagnosis the mean clinical picture presented by a group of 285 cases with bacillary sputum was used, together with a special system of assessing the respective intensity of individual factors. Signs, symptoms, etc., were tabulated as +, ++, +++, or as −, when no observation was made. Percentage intensity could vary from 33 per cent when all positive findings were minimal to 100 per cent when maximal. After a laborious series of trial classifications along the lines of the criteria of Lawrason Brown, a rough clinical grouping was made along lines found more practical in this survey, as follows: *1: Patients (never?) showing tubercle bacilli in their sputum. 2: Sputum-negative cases showing* simultaneously any two of the following: (1) bilateral apical infiltration; (2) persistent apical râles indicative of a lesion; (3) mucous-membrane tuberculosis; (4) tuberculous pleuritis; (5) haemoptysis; and (6) night-sweats. It is assumed that no other explanation for the above was found. *3: Patients showing one of the features under 2, together with* (1) impaired apical percussion note; (2) definitely altered breath- or voice-changes; (3) cough; (4) relative tachycardia; or (5) significant loss of weight. It is also assumed that no other satisfactory explanation is found for these findings. This last group was more numerous in West China than the others combined. For East China, a new staining technique devised by Stempa was used which gave a much higher proportion of positives than even the concentration method with the older stains. Group 1 was found, as would be expected, to carry the worst prognosis. More than one-third of group 2 cases were chronic, while many of group 3 eventually became acute group 1 cases. *Comparison of findings by various methods*: Significant tracheobronchial lymph-node enlargement is determinable by physical examination and apical pleuritis occurring in acute cases usually gives definite signs. Physical examination is at least as reliable

as fluoroscopy. In China cases of endogenous open phthisis spreading from previously infected or caseous tracheobronchial lymph nodes are extremely common. An increased incidence in the fifteen years following puberty is noted here as elsewhere. *Findings from student health examinations:* Most Chinese universities of first rank now require more or less complete annual physical examination. In the West China Union University about 40 examiners participated. In the case of students and nurses working at the Shanghai Chinese Red Cross Hospitals the findings were checked by radiography. The diagnosis of tuberculosis "scars" was made in from 9.7 to 15.4 per cent of cases, these being defined as "pathological alterations of the physical signs in the upper thirds of the lungs or the bases not otherwise explainable." The male incidence was generally much higher, which is explained by "health insults" due to night life with increased opportunity for reinfection.—*Intra-Thoracic Tuberculosis amongst the Chinese with Special Reference to the Province of Szechuan, H. G. Anderson, Tubercle, March, 1935, xvi, 241.*—(*A. P.*)

Intrathoracic Tuberculosis in China (*continued*).—H. G. Anderson previously explained his grouping of cases observed mostly in clinics and dispensaries and the same groups, 1, 2, 3, are again used, the percentage incidence of various findings, clinical, historical, laboratory etc., being tabulated. Cough, asthenia, wasting, "dysfunction of the shoulder girdle," tachycardia, and abnormalities in the neutrophilic blood picture, predominate in group 1. Anderson also charts "percentage intensity" of symptoms, although not explaining how the latter indices are arrived at. For example, the opium habit is listed at approximately 55 per cent intensity in each group, and alcoholism about 50 per cent. The West China cases (Szechuan) are compared with the Chinese and nonChinese groups of East China. The differences as tabulated are not striking, except that haemoptyses were about twice as frequent in the West China group. The results of the Mantoux test, using 0.1 mgm. O. T. are charted as to incidence and intensity, and again "55 per cent intensity" recurs. The tricresol-ring test is also charted, being most marked in group 1. In East China findings are said to be comparable to those of a modified Vernes test devised by Li Yuen Po, serologist of the Lister Institute, with no false positives in syphilitics. Various blood pictures and figure indices are discussed, including Houghton's N+M−2L (Neutrophiles plus monocytes minus 2x lymphocytes), but Anderson thinks a simpler and better blood index of toxaemia is 100 − 31 (3x lymphocytes).—*Intra-Thoracic Tuberculosis amongst the Chinese, with Special Reference to the Province of Szechuan, H. G. Anderson, Tubercle, April, 1935, xvi, 294* (*continued*).—(*A. P.*)

Intrathoracic Tuberculosis in China (*concluded*).—*Survey of blood pictures and indices:* Anderson's experience inclines him toward two tests and modifications to express general toxaemia, these being based on the work of Arneth and Schilling, and consisting of (1) filament neutrophile percentage of total neutrophiles, and (2) neutrophile nuclear-lobe count (expressed most conveniently as a percentage of the normal). To these he would add the *N. E. L. M. Index*, simplified by him to a simple *lymphocyte index*. Combining these in some form of haemogram tends to stabilize the findings, the faults of one method being tempered by the others. It is not claimed that such findings are of more than immediate informative value in estimating prognosis. The differential blood count, however, seems to measure the remote prognosis better than the sedimentation rate. *Survey of symptomatology incidence in groups:* Haemoptysis appears to be a peculiar feature in West and Central China. Cough is not as common in the West China series as in American sanatoria. Intrathoracic pain is fairly common, usually anteriorly, along a line dipping from the angle of the sternum to above the nipple and in a corresponding location between the scapulae posteriorly. Anderson believes its aetiology is irritation of perivascular nerves in close apposition to lymph nodes, although some similar substernal pain occurs with acute gastric irritation. Pain is more frequent in the East China series. Asthenia and emaciation show a high incidence in Anderson's group 3, while anorexia and night-sweats predominate in his group 1 (definite sputum-positive group). He hypothecates a relation between "nasopharyngeal sepsis," toxaemia, and assumed inflammation of tracheobronchial lymph nodes. "Menstrual defects" were common in all three groups, but especially in group 1. "Neurosis" appeared to be of high incidence, especially in group 1. Anderson notes that nearly one-third of sputum-positive cases were afebrile on consultation or hospitalization. Tachycardia was most frequent in group 1, and least so in group 3. "Pulse difference" (*i.e.*, difference between normal and actual pulse-rate corresponding to a given degree of temperature) shows a high incidence (62 per cent) in group 1 and a low one (11.5 per cent)

in group 3. Extrapulmonary complications are not adequately tabulated. Muscular wasting and dulness on percussion are discussed at length, changes in breath- and voice-sounds briefly. "Lesional râles" occurred in about 65 per cent of group 1 and 4.3 per cent of group 3, with their coarseness increasing from 3 toward 1. "Nasopharyngeal sepsis" is discussed in great detail, as a predisposing aetiological factor, as a pathological complication, and as a source of difficulty in diagnosis. Positive Rahn serum tests occurred in about 15 per cent of all three groups. The opium habit was almost as common and chronic alcoholism about twice as frequent, reaching to 37 per cent among group 1. Opium is the panacea of the Chinese native physician. It is produced in the Province of Szechuan. *Summary: 1:* Any scheme of tuberculosis investigation on a large scale must be governed by considerations of economy, simplicity, and available aids to diagnosis. Anderson believes that his system of grading signs and symptoms by intensity is valuable; also, his rather unorthodox system of classification, in which only 1 is the sputum-positive group, 2 and 3 being differentiated by other features mentioned previously. *2:* Localization by physical signs does not show satisfactory correspondence with fluoroscopic findings except in the case of "tracheobronchial gland enlargement." Accurate roentgenography would, of course, be preferable. "Tuberculous scars" seem to be less frequent amongst the Chinese than among a group of North American students. *3:* Vital statistics reported from various large Chinese centres are probably too low for tuberculosis mortality and are certainly unreliable. It is suggested that the recorded mortality for Chinese in the United States in 1911 (658.5 per 100,000) may be about the present rate in Shanghai. In East China the disease tends to be more acute amongst Chinese than amongst Europeans. The Mantoux tuberculin test varied little throughout the groups. *4:* The influence of nasopharyngeal sepsis is suggested as a factor in tracheobronchial lymph-node enlargement and in the spread of tuberculosis from old foci in these lymph nodes. Chronic alcoholism and opium addiction may be predisposing factors, and a family history of tuberculosis is very common in West China. —*Intrathoracic Tuberculosis amongst the Chinese, with Special Reference to the Province of Szechuan, H. G. Anderson, Tubercle, May, 1935, xvi, 350.*—(*A. P.*)

Tuberculosis Surveys in Puerto Rico. —Tuberculosis surveys were carried out on a coast and a mountain municipality of Puerto Rico. The coast municipality (Cataño) is situated across the bay from the city of San Juan. It is mainly urban, with 32 per cent of colored people, and has a high morbidity rate for malaria and a tuberculosis death-rate of 429 deaths per 100,000, or 53 per cent higher than the island rate. The mountain municipality (Adjuntas) has 94 per cent of white people. It has a high morbidity rate from hookworm disease, and a tuberculosis death-rate of 180 deaths per 100,000, which is 35 per cent lower than the island rate. The survey included home visits, physical examination of cases with suspicious symptoms of tuberculosis, and the application of the intracutaneous tuberculin test with O. T. to all children under fifteen. Suspect cases and contacts had X-ray pictures of the chest taken. The survey covered 456 homes with 2,470 people in the coast municipality and 457 homes with 2,591 people in the mountain municipality. The incidence of cases of tuberculosis, the rate of infection as revealed by the Mantoux test, and the proportion of families with positive tuberculosis history were considerably higher in the coast municipality, which was also found to have greater overcrowding within the homes, much intercourse with large centres of population (the cities of San Juan and Bayamon) where the tuberculosis mortality rate is high, and somewhat less poverty and ignorance than the mountain municipality. Fifty-five per cent of 1,014 children on the coast and 45 per cent of 1,114 in the mountains reacted to the intracutaneous tuberculin test. The lowest proportion of reactors was found in the age-group under one, of whom 40 per cent reacted. The incidence of reactions in the other age-groups was as follows: from one to four, 46 per cent; from five to nine, 53 per cent; and from ten to fifteen, 69 per cent. There were 51 per cent of reactors among children living in the towns of both municipalities, as compared with 38 per cent among those living in the country. The incidence of cases of tuberculosis was 2.4 per cent of the surveyed population on the coast, and 1.1 per cent in the mountains. Thirty-four per cent of the families living on the coast and 26 per cent of those in the mountains had positive histories of tuberculosis. Great overcrowding of dwellings and nearness to large centres of population, where tuberculosis mortality is high, appear to be the important factors in the causation of the high tuberculosis mortality and morbidity of the coast municipality. The outstanding facts revealed by the survey are the greater seriousness of the tuberculosis problem in the coast municipality, and in the towns as compared with the country; the

large proportion of families with history of tuberculosis; the widespread tuberculous infection in town and country, especially in the coast municipalities; and the scarcity of nonpulmonary tuberculosis, only one case having been found in the two areas surveyed.—*Tuberculosis Surveys in Puerto Rico. I. Study of a Coast and a Mountain Municipality by J. R. Pastor, P. M. Otero and G. C. Payne, Puerto Rico J. Pub. Health & Trop. Med., June, 1935, x, 451.*—(*J. R. P.*)

Tuberculosis Surveys in Puerto Rico.—This survey was carried out in two urban communities near the city of San Juan, and included 716 families, totalling 4,877 subjects, 69 per cent of whom were white and 31 per cent colored (mulattoes and negroes). The average family consisted of 5.6 per cent persons, and there were, on an average, 2.3 persons per room. Of the families, 347 had monthly incomes of less than $3.00 per person, and only 187 had more than $10 per month per person. Thirty-two per cent of the subjects were tuberculosis contacts. The intracutaneous tuberculin test with O. T. was applied to 4,025 individuals. One tenth of a milligram was used for the first dose and 1 mgm. for the second: 79 per cent reacted positively. According to age, the incidence of reactors was as follows: 22 per cent below one year of age; 38 per cent from 1 to 5; 66.6 per cent from 5 to 10; 82 per cent from 10 to 15; 90.6 per cent from 15 to 20; 94 per cent from 20 to 30; 98.3 per cent from 30 to 40; and 96 per cent above 40. There were only two four-plus reactions. Seventy-seven per cent of the whites, 83 per cent of the mulattoes and 85.4 per cent of the blacks reacted. The percentage of reactors was higher in the females (81 per cent) than in the males (75 per cent). Ninety-two cases of pulmonary tuberculosis were discovered, equivalent to 2.3 per cent of the surveyed population. No cases of nonpulmonary tuberculosis could be found. The significant findings of this survey are the conditions of extreme overcrowding and poverty prevailing in the surveyed areas, the large proportion of reactors to the intracutaneous tuberculin test at all ages and the scarcity of very intense (++++) reactions with an initial dose of 0.1 mgm. O. T.—*Tuberculosis Surveys in Puerto Rico. II. A Study of Two Urban Communities. Preliminary Report, J. R. Pastor, P. M. Otero, G. C. Payne, R. R. Santos and E. Silva, Puerto Rico Jour. Pub. Health & Trop. Med., June, 1935, x, 514.*—(*J. R. P.*)

Bovine Pulmonary Tuberculosis in Man in Denmark.—Bovine pulmonary tuberculosis in man has been regarded as extremely rare but recent investigations by Griffith, Cumming, Munro, Bruno Lange, Begtrup-Hansen and Jensen have pointed to new conceptions. Three chief questions arise: *1:* How are such cases distributed, especially in rural and urban populations? *2:* What is the origin and route of such infection? *3:* What, if any, are the characteristic clinical features and the prognosis? *Distribution:* For countries outside of England and Scotland, Griffith finds a maximal incidence of bovine strains in sputum of 6.3 per cent. For England, however, the rate is nearer 1 per cent and for Scotland about 3.6 per cent. In Northern England (Bradford) Cumming has found the incidence nearly as high as the Scotch. While the predominance of alimentary origin is generally agreed on, Bruno Lange found 8 of 40 cases in German dairy-workers presumably caused by exogenous air-borne infection and in Denmark Blegvad and Jensen reported 6 cases of primary conjunctival tuberculosis in milkers due to bovine infection. In Denmark the frequency of bovine infection differs in different parts of the country. Jutland, especially the West and South portion, shows a considerably higher incidence than Eastern Denmark and Copenhagen. A similar distribution holds for bovine pulmonary tuberculosis. However, the 26 cases here reported are from Copenhagen, occurring between February, 1931, and July, 1933. In the State Serum Institute the bovine bacilli were demonstrated from specimens submitted, the patient showing clinical and/or roentgenological signs of pulmonary or tracheobronchial lymph-node tuberculosis. Bovine bacilli were also isolated from 39 additional cases of tuberculosis in Copenhagen with no additional evidence of pulmonary or tracheobronchial lymph-node lesions. In 28 cases the cervical lymph nodes were involved. *Age:* Of the 26 cases of pulmonary tuberculosis, 10 were under five years of age (6 under two years), 8 between 5 and 15 years, and 8 over 15, the oldest being thirty-two. Only one case gave a family history of tuberculosis and this is in sharp contrast to cases of human-type infection, where in Denmark in about 50 per cent of cases one or both parents have been found tuberculous and up to 75 per cent have shown some demonstrable source of infection. A girl of 16, daughter of a farmer in Frederiksborg County, one of 14 children, of whom 3 adult sisters died of tuberculosis. Tuberculous cattle had been common in the farm stock and raw milk was often drunk. In April, 1932, the patient was treated for psoriasis at the Finsen Medical Light Institute. After about a month she had

sudden high fever and severe erythema nodosum, at which time *bovine* tubercle bacilli were recovered from the blood by culture on Besredka's medium and upon animal inoculation. There was also hilar and perihilar involvement as shown by X-ray of the chest. Two years later the patient was well. The father's sputum showed tubercle bacilli of human type, both on culture on Löwenstein's medium and animal inoculation. Thus, contraction of infection from the father seems to be ruled out, and this is the only case in which any such possibility existed. *Pathology and associated lesions:* Five of the 10 children under five years of age had had previous abdominal symptoms, while 3 other patients showed signs of abdominal tuberculosis coincident with their pulmonary involvement. This strongly suggests an alimentary route of infection. As far as the pathological process could be determined by X-ray and clinical findings, and making allowances for the age-groups, there seemed to be no definite characteristics differentiating processes due to bovine from those due to human type bacilli; and Griffith and Lange see no reason to believe the bovine type less virulent for man. Griffith has found one-third of type-determined cases of tuberculous meningitis in England due to bovine infection, while Cumming finds the pulmonary lesions pursue a slow but relentless course. *Clinical course:* Of the 26 patients, 6 died, all of generalized tuberculosis; 17 recovered clinically; and 3 are still under treatment, with prognosis good. No necropsy was performed. It seems that the prognosis is serious in children under 5, including those in whom tubercle bacilli were isolated from the gastric contents, as Poulson and Andersen found. *Laboratory findings:* From 26 patients 51 specimens of material were examined, bovine tubercle bacilli being recovered from 36, with 15 negative. Most of these were from the stomach-washings (25 positive out of 36). Tubercle bacilli were demonstrated only on gastric lavage in 18 of the 26 patients. Possible sources of error have been quite thoroughly eliminated by Levin. All of this series on whom this was done had received either boiled milk or milk from tuberculin-negative cattle and it was done early in the morning before taking food. Poulsen and Andersen got repeatedly negative results on tuberculin-negative children. The chief significant sources of error consist in possible tuberculosis of the tonsils and lymphoid tissue of the nasopharynx. *Summary: 1:* Twenty-six cases of bovine type pulmonary tuberculosis are reported, all from Copenhagen. The strains of tubercle bacilli were type-determined in the State Serum Institute. All were young and most of them children. *2:* In only one case could a human source of probable infection be found, and this was eliminated because not of the bovine type. On the other hand, most of them had consumed raw milk and a considerable number had associated cervical lymphadenitis. *3:* The pulmonary processes showed no characteristic features of differentiation. *4:* In about two-thirds of the cases, tubercle bacilli were cultivated only from the stomach washings. *5:* Six patients died of generalized tuberculosis and the prognosis of bovine-type pulmonary tuberculosis seems as serious as that of the human type.—*Bovine Pulmonary Tuberculosis in Man. Twenty-Six cases from Copenhagen, F. Tobiesen, K. A. Jonsen and H. C. A. Lassen, Tubercle, June, 1935, xvi, 385.*—(*A. P.*)

Death-Rates in Coal-Miners in England and Wales.—There has always been well defined local differences in the mortality records with regard to pulmonary diseases among the miners in various coalfields of England and Wales. Analysis of the records for 1921 to 1923 was made to ascertain whether the differences were due to differences peculiar to the occupation as compared with the nonmining population. In the age-group 25 to 44 years, Hewers and Getters in Glamorgan-Monmouth show 30 per cent excess of bronchitis-pneumonia mortality over those in Nottingham-Derby. For nonminers the excess is 24 per cent and for women it is 4. For phthisis the miners' excess is smaller, 16, than that for nonminers and women, 34. For the age-group 45 to 64 years, the miners in Glamorgan-Monmouth show virtually the same excess of bronchitis-pneumonia. For tuberculosis Hewers and Getters show a larger excess, 34 per cent, than for nonminers, 21, and women, 26. At ages 65 and over, Hewers and Getters in Glamorgan-Monmouth show an excess of bronchitis-pneumonia mortality amounting to 40 per cent. Tuberculosis deaths are too few for reliable comparison. The mortality figures fail to show satisfactory evidence that the excess of miners' respiratory mortality arises from factors connected with their occupation.—*A Comparison of Mortality Rates from Bronchitis and Pneumonia, and from Respiratory Tuberculosis, in Coal-Miners and Other Residents in the Counties of Nottingham, Derby, Glamorgan and Monmouth, 1921–23, P. Stocks, J. Indust. Hyg., September, 1935, xvii, 217.*—(*L. F. B.*)

Tuberculosis in College Students.—Tuberculosis is a serious problem in the

years of late adolescence and early maturity, that is, the college age. College administrators now realize the hazard from tuberculosis and the economic loss involved, and have inaugurated special facilities for tuberculosis control in their student health departments. The American Student Health Association has set up a well-defined program for case-finding, and recommended its adoption by the colleges. It calls for surveys, including histories, physical examinations, tuberculin-testing, X-ray studies of positive reactors and follow-up of cases, discovered or suspected. Recent surveys have shown a considerable variation in case-incidence in colleges in different parts of the country. About ten times as many cases have been found in colleges with control programs as in colleges with no methods of early detection. An ideal program is being inaugurated at the University of California and Stanford University under the auspices of the San Francisco, Alameda County and California State Tuberculosis Associations. Two thousand freshman students will have the usual complete examination, and tuberculin tests and X-rays will be repeated each year on those negative the previous year. The program will be carried through the four-year course and into the graduate schools, and subsequently until the end of a ten-year period.—*Campaign against Tuberculosis in College Students, C. E. Shepard, Am. J. Pub. Health, October, 1935, xxv, 1118.*—(*E. R. L.*)

Tuberculosis in Young Female Adults.—Tuberculosis mortality at all ages in females has had an actual and comparative fall since 1850. In certain industrial areas associated with economic stress the mortality rates in young adults, 15 to 25 years, have, however, risen. In one area the rate for young females rose from 185 per 100,000 in the years 1921 to 1925 to 268 per 100,000 in the years 1930 to 1932. The figures for males rose from 131 to 197. Possible causes point to general sociological forces and epidemiological and intrinsic changes with regard to the disease itself. Actual work is probably not so much an adverse factor as the anxieties associated with it. It is suggested that the modern emancipated female is not only subjected to the strain of wage-earning, but also to that of wage-spending. As the circumstances of employment of males and females are relatively similar, it would appear that the cause of the rise in rates for females is to be looked for with some regard to their sex and physiological economy. One result of modern hygienic measures against tuberculosis should be an increasing number of people uninfected with tuberculosis or infection delayed until early adult life. Boys and girls in England and Wales leave school with relatively the same degree of infection and sensitization and, when exposed to risk in young adult life, there is a steep rise in mortality and incidence, but it is higher and more rapid in females. The gravest type of case in the young female adult appears to coincide with the conception of local changes in an allergic state. The mortality curve in females coincides closely with that of their menstrual life.—*The Increase of Tuberculosis in the Young Female Adult, W. S. Gilmour, J. State Med., October, 1935, xliii, 567.*—(*L. F. B.*)

Tuberculosis among School Employees.—A campaign was conducted among the personnel of the Minneapolis schools, covering all those employees who came into direct contact with children. Of the personnel, 2,190 were tested with tuberculin, and 1,384 elected the option to be tested by private physicians. Of the 2,190 tested, 1,112 were definitely negative and 1,078 (49.22 per cent) were positive reactors. Excluding the schools in which there were fewer than 5 teachers (two of these schools were 100 per cent negative) the lowest figure was 10 per cent positive out of ten teachers tested. The highest reading was 82 per cent positive out of 23 persons tested. The highest group-incidence was given by the school-nurses, 91 per cent of the 55 being positive. Among 2,466 who had X-ray films made of the chest, 1,453, or 58.98 per cent, showed no evidence of disease. Sixty-six presented evidence of fibrinous pleurisy as indicated by obliteration of the costophrenic angle, diaphragmatic adhesions, and so on. In 29 cases there was evidence of coexisting first-infection type of tuberculosis and fibrinous pleurisy. There was questionable evidence of the first-infection type of tuberculosis in 85 cases, while in 532 others there was more definite evidence of the first-infection type of tuberculosis. In 78 cases there was definite evidence of parenchymal involvement. Of these, 69 apparently had pulmonary tuberculosis, and 9 had nontuberculous lesions. The entire cost of the survey to the school-board, of 2,099 tuberculin tests and 2,238 chest films, was $5,525.50. The preparation for the examination of teachers in any community must begin with the approval and active support of the local medical society, followed by the proper issuance of an order by the school board. In this survey, one employee was found to be disseminating tubercle bacilli and 68 others presented lesions that were probably due to tuberculosis of the

reinfection type. Subsequent examinations have brought to light 5 more open cases of tuberculosis. Teachers, found to have open tuberculosis, should be given leaves of absence until treatment aids in rendering the sputum negative and the lesions are brought sufficiently under control, so that it is safe for the teacher to return to work. Those who have lesions which are not progressive should be examined periodically and, if at any time the lesion is found to progress, treatment should be instituted.—*Tuberculosis among Employees of the Minneapolis Schools, F. E. Harrington, J. A. Myers and Ida Levine, J. Am. Ass., May 25, 1935, civ, 1869.*—(*G. L. L.*)

Medical Service in Village Settlement.—The medical services are built around the settlers. Since they are insured persons the medical officer becomes almost automatically a panel doctor. Besides being a village practitioner the medical officer acts as physician to the settlement hospital with charge of beds, and runs an out-patient department modelled after that of a general hospital. The out-patient department forms the centre from which all the clinical supervision of the contacts takes place.—*Medical Services in a Village Settlement, L. B. Stott, J. State Med., June, 1935, xliii, 339.*—(*L. F. B.*)

Antituberculosis Measures in Massachusetts.—The mortality from pulmonary tuberculosis in Massachusetts has declined in 77 years from 395 per 100,000 living to 47.7 in 1933 and 43.8 in 1934. Assuming 9 cases for each annual death there are probably 18,000 active cases in the State and approximately 27,000 known cases are recorded in the files of the State Department of Health, including all cases, regardless of activity, reported since 1915, minus those withdrawn on receipt of death notice. In spite of this decline tuberculosis is still a leading cause of death between ages 15 and 40, and newer methods of attacking the problem demand our resources. *Ten-year program:* Initiated by H. D. Chadwick, this is under the charge of A. S. Pope, who has furnished statistical data. A state-wide investigation of school-children began in 1924 and about 400,000 of a total of about 990,000 (slightly over 40 per cent) enrolled in the schools were tuberculin-tested by the Pirquet method, of whom about 25 per cent reacted. Physical examination was done on 117,777 and X-ray examination on 103,462. During the first three years the children were selected from known contacts, underweights and suspects referred by local physicians and school nurses. During the last seven years no such selection was made, and the percentage tested has risen to 65.3 per cent of grade-school children and 56.7 per cent in high-schools. The rate of reaction rises regularly about 10 to 15 per cent at the age of 5, to nearer 50 per cent at the end of high-school life. X-ray examination of reactors showed 5.6 per cent to have lesions of childhood-type tuberculosis (1.4 per cent of total) and a sufficient number of adult type to indicate at least 1,800 such cases in children from 10 to 19 years of age. In the 10- to 14-year group the mortality among girls is one and one-half times as high as for boys, and in the 15 to 19-year group it is three times as high among girls. A large proportion are unrecognized and uncared for. In June, 1934, the State Department of Public Health terminated the Ten-year program, but will continue the follow up of tuberculous children already discovered. In a few of the larger cities the routine examination of school children annually in the 7th, 9th, and 11th grades, family contacts and patients referred by physicians and public health nurses, can be carried out under the direction of local Boards of Health. For smaller communities a travelling clinic will be available on request of the local Board of Health and school committee to the State or County sanatorium of the district, except where towns are near enough to send directly to the sanatorium. A few isolated communities will be served directly by the State Department of Public Health. *Tuberculous infection, reinfection and contact:* Pope and Myers, separately following groups of children with positive and negative tuberculin tests, found that the pulmonary form of the disease develops 3 or 4 times as often in groups with childhood-type lesions as in those positive reactors with no lesions. The appalling gravity of the adult type in children is shown by a follow up of 88 children discovered in Chadwick's clinics between 1924 and 1929, of whom 28 per cent are known to have died and only 9 appear to be entirely well. This includes all pulmonary cases discovered the first five years of the clinics. The proportion of children with childhood-type tuberculosis is greatly increased in known contacts (12.6 per cent against 0.8 per cent), and Zacks showed a history of contact with an open case in the family in 65 per cent of 110 children carefully studied. However, the discovery of pulmonary tuberculosis is of relatively little value unless the diagnosis is made early and effective treatment instituted. Discovery of disease may be expected in one out of each 4 or 5 contacts. Annual X-ray examination of all school-teachers should be done, and nurses in hospitals should be routinely

investigated at the time of enrollment and every six months afterward, if previously negative. At Bellevue Hospital Amberson and Riggins found 3.15 per cent new cases among 380 nurses of 18 years and over; at Detroit (Altschuler) 6.25 per cent of 96 developed the disease, and Kristenson at Upsala discovered 9.4 per cent, compared with 1.5 per cent among girls the same age at a housekeeping school. All diabetics should have an X-ray examination, as Root has shown that active tuberculosis at autopsy is two or three times more common than in nondiabetics, and the childhood and adult types in diabetic children under 15 are thirteen times as frequent as normally; in diabetics between 15 and 20 years, pulmonary tuberculosis is sixteen times more common than in corresponding high-school students, while nearly 3 per cent of adult diabetics show active pulmonary tuberculosis.—*The Prevention and Control of Tuberculosis in the Commonwealth of Massachusetts, with Special Reference to the Activities of the Massachusetts Tuberculosis League, F. T. Lord, New England J. M., May 23, 1935, ccxii, 967.*—(*A. P.*)

Mass Control of Tuberculosis.—The recognition of the importance of exogenous infection in tuberculosis has brought about new trends in mass control. Ten years ago, adult tuberculosis was thought to be brought about mainly by endogenous reinfections, and the antituberculosis campaign was accordingly directed to prevent the flaring up of old, latent foci. The rôle of contagion in the spread of tuberculosis was not fully understood until later, when studies concerning the modes of transmission of the disease within households were undertaken. The remarkable success of the campaign of the U. S. Department of Agriculture for eradicating tuberculosis in cattle through the slaughtering of the diseased animals has made evident the importance of destroying foci of infection to control the disease. In man this would mean the isolation and continuous observation and education of the open case. The antituberculosis campaign should be directed to find the bacillus-carrier and to keep him from infecting others. The agency for case-finding is the tuberculosis clinic or dispensary, which may be permanent or transient. The visiting nurse, who looks for new cases and instructs the family of the patients on the prevention of the disease, is an essential part of the tuberculosis clinic. The prevalence of tuberculosis during adolescence makes it important that high-school children be examined. When funds are limited, the greater part of them may be devoted to this purpose, testing with tuberculin every high-school child and X-raying the positive reactors. Negative reactors should be retested every succeeding year. Cases of latent or manifest tuberculosis should be followed up and the sources of contagion investigated in each case. College students and industrial groups should be studied in a similar manner. From a public-health standpoint sanatoria can accomplish more by isolation of sputum-positive cases than by the once-approved system of taking only early cases, more easily restored to health. Through the use of the various measures of collapse therapy, especially pneumothorax, it is possible to render patients sputum-negative in a few months, and each tuberculosis bed can be utilized in this manner for several patients in the course of the year. A competent follow-up system in the home is essential for the success of such a program. Finally, the modern antituberculosis campaign requires that the collection of vital statistics be promoted and made efficient.—*Modern Measures in Mass Control of Tuberculosis, E. R. Long, Puerto Rico Jour. Pub. Health & Trop. Med., June, 1935, x, 417.*—(*J. R. P.*)

Effects of *BCG*.—Many of the favorable reports on the protective effects of *BCG* are open to certain criticisms. To begin with, the comparative figures that Calmette and his co-workers have cited, as the mortality rates from tuberculosis of nonvaccinated children living in tuberculous surroundings (France, 24 per cent; Paris, 32.6 per cent; Roumania, 25 per cent), are probably too high. Another defect in some of the statistics is that vaccinated and nonvaccinated children are not necessarily kept in the same surroundings. Furthermore, it is natural to suppose that parents who have their children vaccinated against tuberculosis are more solicitous about their children as regards hygienic measures in general. It must further be considered that vaccinated children, especially those reported by Wallgren, have, as part of the procedure, been isolated for varying periods of time up to 6 months following the injection, and finally that premature, weak, or sickly infants are usually not subjected to the procedure. On the other hand, there have been a few well-controlled studies, such as those of Heimbeck and of Park, in which the favorable effects of *BCG* have undoubtedly been demonstrated. There is no evidence in the literature that uncontaminated *BCG* has had any deleterious effects, aside from the local reactions to the injections. The author's studies (Prague) are limited to a small but carefully studied series of 37 children, 20 of whom received

the vaccine orally, the others by injection. Of the former, the tuberculin reactions remained negative or inconstant in 16, while in the injected group 11 of the 17 developed tuberculin allergy, which, however, was weaker and later in appearance than that which develops from ordinary tuberculous infection. Local reactions in the form of cold abscesses developed in half the injected children. Benign enlargement of the tracheobronchial lymph nodes may develop after oral or parenteral *BCG* administration. No deleterious effects of *BCG* were demonstrated either clinically or postmortem (in children dying of intercurrent infections). As to the protective effects of *BCG* in this series the author is skeptical, in view of the fact that three of the children developed typical primary tuberculosis despite their having received *BCG*, one by injection, the other two orally. Separation from tuberculous persons is the best method of prophylaxis. Administration of *BCG* should be continued, but only to children who are forced to live in tuberculous surroundings. Conclusions as to effectiveness should be drawn only in cases that can be closely observed.—*Die klinischen Ergebnisse der Calmetteschen Schutzimpfung, B. Epstein, Jahrb. f. Kinderhk., November, 1935, cxlv, 237.*—(*M. D.*)

Effects of *BCG*.—These studies from the Phipps Institute over a period of 7 years concern 70 children who were vaccinated orally with *BCG* within the first 10 days of life and 167 nonvaccinated children observed as controls. The proportion of white to Negro was approximately 2:1 in each group. Both groups could be subdivided into three classes: (1) those in contact with persons with tuberculosis, whose sputum contained the tubercle bacilli (41 vaccinated and 84 controls); (2) those in contact with persons with tuberculosis whose sputum did not contain the tubercle bacilli (15 vaccinated and 45 controls); and (3) those not in contact with any persons known to have the disease (14 vaccinated and 38 controls). Practically all the children were tested by tuberculin intracutaneously and examined for lung lesions with the X-ray. The observations, as summarized in a table, indicate that the administration of *BCG* vaccine to newborn children exposed to patients with manifest tuberculosis may prove of value in reducing the mortality from this disease in infancy and childhood.—*Effect of Vaccination with BCG on Tuberculosis in Infancy and in Childhood: Correlation of Reactions to Tuberculin Tests, Roentgenologic Diagnosis and Mortality, J. D. Aronson and A. M. Dannenberg, Am. J. Dis. Child., November, 1935, l, 1117.*—(*M. D.*)

Effect of *BCG* in Experimental Tuberculosis.—In the present study experiments were done to determine the safest and most efficient way of using the vaccine. Also, allergy and resistance were studied as related to each other and as each is related to the presence of antibodies. The strain of *BCG* used was originally obtained from Calmette in January, 1930. Since 1933 this strain has been cultivated on glycerine-dextrose-veal agar. It had not come in contact with bile since October, 1930. Four methods of administering the vaccine were studied and compared,—the injection of (1) living organisms subcutaneously, (2) living organisms intravenously, (3) heat-killed organisms subcutaneously, and (4) heat-killed organisms intravenously. No mechanical injuries, such as bacterial emboli or any other kind of tissue trauma, were at any time observed from vaccinating many animals (rabbits) by each of the four methods. Following large doses of vaccine administered intravenously to allergic animals toxic effects may result, but with moderate doses no delayed toxicity was noted. Allergy was most frequent and pronounced in animals vaccinated subcutaneously with living *BCG*, next greatest in animals vaccinated intravenously with living *BCG*, and least in animals vaccinated subcutaneously with heat-killed *BCG*; but it did not occur at all in animals given intravenous injections of heat-killed *BCG*. Allergy appeared at the latest in two to three weeks following vaccination. It tended to disappear in one to three months, depending on the degree, while the animal was still resistant. Allergy never developed in the absence of lesions. In normal animals lesions (nonprogressive) in visceral organs were produced only by injecting living organisms intravenously, but in the allergic animals intravenous injection of heat-killed organisms produced a few lesions. There appeared to be no proportionate or necessary correlation between the presence of allergy and the existence of concentration of agglutinins, complement-fixing antibodies or opsonins. Furthermore, allergy bore no relation to resistance, as animals vaccinated with *BCG* but not allergic resisted the subsequent inoculation of virulent bovine bacilli as well as the vaccinated allergic animals. The degree of resistance, however, tends to be correlated with the concentration of antibodies in the blood. Resistance is the chief factor to be considered in the use of *BCG* as a vaccine against tuberculosis, for, unless a fair degree of increased resistance is developed, vaccination is useless. Rabbits were used in experiments with the bovine strain and guinea pigs in those with the human strain. These animals were vac-

cinated with *BCG* and then received minimal lethal doses of the strain indicated. In both groups tuberculosis was either actually prevented (in the vast majority of instances), or its development greatly retarded. In general it can be said, as far as safety in the process of vaccination with *BCG* is concerned, that all methods are safe except the one in which the living organisms are injected intravenously. Even by this method progressive tuberculosis does not occur, but too many nonprogressive tubercles develop in the lungs, liver and spleen to permit one to consider it a safe method. Allergy has dangerous aspects, such as allergic shock, and increased susceptibility to the development of lesions, but, when it is taken into consideration that allergy tends to occur in a relatively small percentage of cases and in small degrees or not at all by adequate methods of vaccination, it is doubtful whether such an amount of allergy should be looked on as a very serious condition. According to our present knowledge, it would seem that vaccination of persons should be limited to those not having a positive reaction to the cutaneous tuberculin test. However, it would be an advantage if it is found that allergic animals can be safely vaccinated intravenously, for vaccination by this route desensitizes these animals at least for a time, and resistance is increased.—*Experiments Relative to Vaccination against Tuberculosis with Calmette-Guérin Bacillus (BCG), B. J. Clawson, Arch. Path., September, 1935, xx, 343.—(J. S. W.)*

Allergy and Antibodies in *BCG* Animals.—The observations reported in this paper were obtained from experiments in progress on vaccinating rabbits against tuberculosis with *BCG*. The three methods of studying the relation of allergy to antibodies, namely, by vaccination so as to produce allergy in some animals and no allergy in others, and by desensitizing highly allergic animals, seemed definitely to show a lack of any proportionate or causal relation between allergy and the concentration of humoral antibodies in the serum. In some animals there was a high degree of allergy with low agglutination and complement-fixation titres. On the other hand, in the absence of allergy there sometimes were very high antibody titres. The ratio between the titres in the two methods was fairly constant. The complement-fixation test was somewhat more constant and delicate. The agglutination test, however, was definite. It required less labor and with care could be depended upon to give as good results as the complement-fixation test.—*Relation of Allergy to the Antibody Content in Animals Vaccinated with BCG, B. J. Clawson and A. B. Baker, J. Infec. Dis., May–June, 1935, lvi, 297.—(F. G. P.)*

Tuberculosis and Milk Supply in England and Scotland.—Although it has been known for many years that tuberculosis can be transmitted to man by means of infected milk, the evil still exists. A great deal has been done to improve matters but the only road to real success is along lines leading to complete eradication of tuberculosis from our dairy herds. The biological test involves taking samples of milk from individual farms, or mixed milk from several farms, and injecting the sediment, after centrifugation, into guinea pigs. The test is not infallible, but it is usually reliable. The greatest objection to it is the length of time required to complete the test and to detect the dangerous cow. It does nothing to eliminate the disease. Routine examination of dairy cattle is a very sound measure, and if frequent clinical inspections became universal a further step toward eradication would be reached. Results from the *Milk Order* of 1923 designating conditions for the production of certified, grade-A tuberculin-tested, grade-A, and pasteurized milk, are rather disappointing. The nomenclature of the order is confusing, but, if there were demand for tubercle-free milk at an economic price, the number of our tubercle-free herds would increase. Grade-A milk, not tuberculin-tested, is produced by cows that must pass a clinical veterinary examination each quarter; and, while it has done much to improve conditions of production, it can not be guaranteed free from tuberculosis. Accredited milk is produced under the same conditions as this grade-A, but it is not necessarily sold in bottles. Pasteurization kills the tubercle bacilli in milk, when present, and renders them innocuous when drunk in the dead state, but does nothing to eliminate the source of the disease. The *Tuberculosis Order* of 1925 enables the local authorities to slaughter any cow found to be suffering from tuberculosis in any form. The *Attested Herd Scheme* is the latest and strictest plan yet devised. The producer must have certificates stating that his cattle have passed the tuberculin test twice at intervals of not more than one year nor less than six months and no reactors found. If the Ministry is satisfied with conditions under which the herd is kept and the herd passes an official test by its own staff, the herd is registered as "attested." Any reacting animal at a subsequent test causes the herd to be suspended and put off the list if further

reactors are found at the second test. About 20 farmers in England and 14 in Scotland have complied with these conditions. This scheme appears too rigid for the commencement of any eradication scheme. Some practicable plan, possibly along the lines of accredited herds and accredited areas free from tuberculosis as judged by the tuberculin test, appears to be required.—*The Elimination of Tuberculosis from the Milk Supply, D. S. Rabagliati, J. State Med., October, 1935, xliii, 576.*—(*L. F. B.*)

Prevention and Treatment of Tuberculosis.—Between 1851 and 1860 the average yearly deaths in England and Wales was 50,893. In 1933 it was 27,854. Deaths in 1911 from nonpulmonary tuberculosis amounted to 14,698 and in 1923, 5,405. Improved case-finding, care of patients and better environment are generally accepted as factors responsible for this decline in death-rate. The findings of the Astor Committee in 1912 and 1913 provided a policy and basis of tuberculosis schemes of local authorities which recommended the establishment of tuberculosis dispensaries, sanatoria and creation of ports of tuberculosis offices. During the past 10 years the scheme has included early and contact case-finding and rehousing of families containing a tuberculous member. In some areas infants and children have been removed from the infected home (Grancher system), but there have been objections to this plan. The protective measure as regards children is to unmask manifest or latent disease in childhood. This should include systematic and thorough contact examination and school-children surveys. Each large business should have an adequate medical staff to deal with its employees, and no case should be allowed to lapse without thorough knowledge of the nature of the illness. Probably not less than 40 per cent of milk-cows are more or less infected, and between 1 and 2 per cent yield tuberculous milk. Since it is not practical, administratively or financially, to provide tests and slaughter diseased cattle, milk should be pasteurized. During the past few years artificial pneumothorax, phrenic evulsion and thoracoplasty have been revolutionizing the treatment of chronic cases. The sanatorium has been taken from its position of isolation and seclusion and placed in closer alignment with the modern hospital and into the general tuberculosis organization. Discontinuance of the dispensary and having patients admitted directly to the sanatorium would lead to chaos and be open to all sorts of abuses. With coöperation between the tuberculosis officers and the practitioners increasing our present endeavor is to establish contact with patients while the disease is still curable.—*Modern Conception of Tuberculosis and its Prevention and Treatment, G. S. Johnston, J. State Med., September, 1935, xliii, 521.*—(*L. F. B.*)

Marriage and Pulmonary Tuberculosis.—The advice of medical men is often sought by tuberculous patients and their guardians on the question of marriage and married life. Two questions are common: (1) whether a tuberculous patient should enter the married state, and (2) whether the healthy partner should continue to live with the tuberculous patient. For the sake of their future happiness and welfare, it is important that they receive correct guidance. These factors enter the question: (1) danger of transmission of disease to a healthy partner; (2) danger to children of tuberculous parents; and (3) possible adverse effects of married life on the patient. They are here considered with special reference to conditions in India. *Effect on healthy partner:* The dangers of transmission of disease to the consort are not great, due to the usual development of immunity as a result of previous infection, and factors other than mere association are more important, such as overcrowding, insanitation, destitution, and social customs and prejudices. The purdah system in India favors tuberculosis in young women and girls by shutting out sunlight and fresh air. Child marriage subjects them, while immature, to the strain of pregnancy, confinement and parturition. These unfortunate creatures are thus made to serve as factories within the four walls of Zenana, where lust-appeasing and child-bearing are carried on until checked by the deadly attack of tuberculosis. The "assortive mating," referred to by Pearson and Pope, is not important in India nor among the poorer classes anywhere. *Danger to potential offspring:* The danger of infection to children of consumptive parents is great, but it occurs after birth. If children are born to parents with open tuberculosis, they should be removed at once from the dangerous environment. The Grancher system of prophylaxis as applied in France is based on the same principle as Bang's cattle experiments in Denmark. In India the suckling of infants is common, and economic conditions militate against separation from the mother. Another prophylactic measure is to check sputum production by collapse therapy. *Effect of married state on the patient:* Men and women present different problems. Sexual intercourse, if moderate, is not apt to do harm, while abstinence may. Patients

should be informed of the bad effects of overindulgence and advised to be moderate. In the case of women, in the absence of pregnancy, they may be actually better off, with a good home, proper care and nourishing food. Financial resources play an important rôle in marriage. The effects of pregnancy have too often been carelessly considered. The most rational view is that while pregnancy with active and progressive lesions is fraught with danger, in chronic quiescent and arrested cases it ordinarily causes no harm. Multiple pregnancies at short intervals, however, may be injurious and should be avoided. If pregnancy occurs, conservative treatment should be tried. Experience shows that while abortion is unnecessary in quiescent cases, it is rarely effective in active progressive disease. The notion that tuberculous patients should be forbidden to marry is senseless and impractical. The race is in no danger of deterioration because of children of tuberculous stock. Moreover, extramarital sexual intercourse is not affected. The tuberculous patient has the same desire for home and love as anyone else. *Conclusion:* The problem of marriage and tuberculosis is bound up with social and economic considerations. With the usual common-sense precautions, conjugal infection is not a serious danger. Tuberculous patients contemplating marriage may do well to wait for some time after symptoms of active disease have ceased. In females, conception should as far as possible be avoided, at least as long as there are active lesions. Infection of children may be avoided or minimized by separation after birth or by vaccination with *BCG* (Calmette).—*The Question of Marriage in Pulmonary Tuberculosis, Z. G. Shrikandé, Tubercle, August, 1935, xvi, 485.*—(*A. P.*)

Tuberculosis in Home Contacts.—Investigations of tuberculous infection in home contacts have been carried out by comparing the frequency of positive tuberculin tests in home contacts and in noncontacts. *Tuberculosis mortality and general mortality:* Figures from four French sources, covering between 5000 and 10,000 home contacts, 4 German sources, covering slightly over 1000 home contacts, 2 Danish sources, covering slightly under 1000 home contacts, 1 American source (Asserson) covering about 300 such contacts, and 6 British sources, covering about 10,000 of these contacts, are tabulated, the British in greatest detail. The following conclusions are formulated: *1:* The tuberculosis mortality in home contacts is much greater than in noncontacts, especially in the first year of life. Some figures (*e.g.* those of Lissant Cox in Lancashire) show a more marked difference as the child becomes older; others the reverse. In the age-group, 2 to 5, a large proportion of tuberculosis deaths occurs in the exposed group. *2:* The great variation in the reported figures of tuberculosis mortality is attributable to (1) conditions peculiar to the country in question, (2) local hygienic conditions and (3) the time at which separation from the contact occurred. *3:* The figures for mortality from nontuberculous causes differ. Here the rôle of welfare organizations and the effects of deprivation of parental care must be considered. *Effect of family relationship:* The incidence of both tuberculous infection and mortality is greater when there is contact with a parent than with a more distant relative, greater with a mother than with a father, providing no separation is effected. The value of investigations into the incidence of tuberculous disease in contacts is doubtful, owing to wide variation in criteria. It is suggested that the Health Organization of the League of Nations attempt to formulate uniform criteria. *The rôle of human contagion:* This can best be appreciated by investigating the incidence of tuberculous infection and disease in children not specially brought up because of a history of exposure. Four French and two English studies are cited. The younger the child, the more likely is home contagion to be found. Contact does not always lead to infection. *Age when contact occurs:* Braeuning and Neumann, dealing only with contacts of sputum-positive cases, found the mortality to vary with the age at time of contact. Van den Berg found contact in the first three months very critical, with a 32 per cent morbidity and an 18.3 per cent tuberculosis mortality within one year. Within two years the tuberculosis morbidity was 45.6 per cent, the mortality 30.5 per cent. *Duration of contact:* The importance of intimacy of contact has been indicated and numerous investigations have shown the obviously greater danger from sputum-positive cases. Schlesinger and Hart have shown that exposure to parents or siblings with nonpulmonary tuberculosis is of little moment. The anteallergic period (prior to development of a positive tuberculin reaction) has been estimated by Bernard and Debré to be inversely proportional to the infecting dose and may be as long as four months. Epstein puts it at three to seven weeks and others roughly parallel this. *Prognosis of infected infants:* Hart in 1932 summarizes published reports on the fate of tuberculin-positive infants. Thirteen of 21 authors report well over 50 per cent mortality. Many factors necessarily affect this.

Separation of infected contacts: The effects of such separation will also involve numerous factors. Most data available are from the French *Oeuvre du Placement Familial des Tout-Petits*, which show, as a difference in mortaility, between 7.6 per cent in those "placed out" and 82 per cent in those not so placed. Factors of selection, however, enter in, also the recent practice in the *Oeuvre Grancher* and *P. F. T. P.* of vaccinating infants with *BCG*. It seems, however, that separation, even after infection, is beneficial, and that repeated doses of contagion are detrimental. *Conclusions: 1:* Postnatal contact is by no means always fatal and does not always infect but does so in a large proportion of children. *2:* The younger the infant the more likely infection and the graver the prognosis. *3:* While dose plays an important part in infection, it is not certain that it plays a part in the later prognosis. *4:* Separating an infant in contact with a tuberculous parent before infection prevents the development of tuberculous disease at least up to the age of four. *5:* It is possible that separating an already infected infant may also prevent the development of tuberculous disease. Such separation is certainly indicated up to the age of 5 years.—*Tuberculosis in Home-Contacts. A Note on the Incidence and the Rôle of Human Contagion, G. G. Kayne, British M. J., April 6, 1935, No. 3874, 692.*—(*A. P.*)

Disease in Tuberculosis Contacts.—As the years pass, defects in our tuberculosis schemes become manifest and lines for improvement are indicated. The routine examination of tuberculosis contacts, that is, persons living with or in close contact with a known case of tuberculosis, was begun at Edinburgh in 1887 and continues on much the same lines to-day throughout Great Britain. Most of those examined are children of school age. Occasionally they are roentgenographed. It was thought that by examination of all home contacts as soon as possible secondary cases in an early stage would be discovered and respond promptly to treatment. Not only have these expectations not been realized but contacts who are healthy when examined have developed tuberculosis later. *Illustrative cases:* These include (1) a boy of 10, seen as a contact in August, 1928, whose clinical and X-ray findings were negative, but whose brother had died a short time previously of phthisis at 21, and who therefore was given two years and three months' care at a children's sanatorium, yet who nevertheless seven years later showed on X-ray coarse mottling in both upper zones; (2) a girl of 9 examined first as a contact in 1919, who subsequently was seen at least three times a year at the dispensary, and who, at her thirty-ninth visit was found to have extensive pulmonary tuberculosis; (3) a young woman of 29 whose mother had died four years before of tuberculosis after ten years of observation and treatment, who was seldom at home, yet developed acute pulmonary tuberculosis in 1933 and died within two months; (4) a girl who, when first seen at the age of 13 was in good health and whose mother of 37 was sputum-negative with very little involvement, who seven years later, at 20, developed an acute pleural effusion and was later found to have extensive disease of the lung on this side with positive sputum; (5) a girl of 11, first seen as a contact in July, 1921, and at intervals for several years, then finally in April, 1934, was found to have advanced active disease. In these cases cited not only did routine contact examination fail to prevent tuberculosis, but it failed to find it at an early stage or check its development. A closer supervision over a long period of apparently healthy individuals at work is scarcely feasible and, even so, might fail to select just those individuals needing institutional care. Such experiences emphasize how frequently, on the one hand, tuberculosis will develop in a patient without giving rise to the standard signs and symptoms, and how, on the other hand, the patient may recover from tuberculosis causing clinical symptoms without any special treatment. *Discussion:* In 1932, according to the Ministry of Health, 28,118 child contacts were examined and 20,413 adults. In the children, 887 pulmonary and 526 nonpulmonary cases were discovered, in the adults 2,914 pulmonary and 118 nonpulmonary,—all this totalling about a 7 per cent disclosure of undetected tuberculosis. Attention is drawn to the large number of adult contacts found affected, many working for years. When physical examination is declined roentgenography can still be of service. *Suggestions: 1:* Omit the routine examination of children, in whom chest examination is especially fruitless. Delicate children should be selected for preventorium care and these should be carefully examined and X-rayed. *2:* Pay special attention to contacts above school-age and X-ray them routinely. Suspicious findings should be followed up. *3:* Enlist the assistance of the practitioner in getting in touch with wayward contacts, obtaining X-ray facilities for suspected adult members of the family, and in investigating workshop and office contacts. Follow up any reported suspicious X-ray findings.—*The Examination of*

Tuberculosis Contacts, E. Ward, British M. J., May 18, 1935, no. 3880, 1024.—(A. P.)

Adult Tuberculosis Contact.—The problem of tuberculosis mortality is chiefly one of adult groups. It becomes acute among females between 15 and 35, and in males between 40 and 60. Pulmonary tuberculosis accounts for most of the mortality and morbidity. In the average community, the contact problem is usually less than half-solved and the greatest percentage of unexamined contacts are adults. In New Haven, after most intensive efforts, in only 31 per cent of 1,428 "registered" families had all household contacts been examined. Every worker has seen acute cases develop in previously unexamined contacts which probably could have been averted with more complete knowledge. Jessel, in Lancashire, England, found "secondary cases" associated with 15 per cent of reported cases of pulmonary tuberculosis. Most of these were directly related to open cases. The average interval before their discovery was three and a half years. Turner, in North Worcestershire, found the vast majority of sputum-positive cases between 15 and 45, and the modal death age among contacts with the disease was in the period from 15 to 25, compared with 25 to 35 in the general population. Barclay reports 18.6 per cent consorts with tuberculosis and 27.5 per cent among wives. In New Haven, pulmonary tuberculosis was diagnosed in 28.4 per cent of contacts examined, 83 per cent of the cases being in adults. Likewise, 83 per cent of deaths occurred among adults. *Families presenting most urgent problems:* (1) Those with a known bacillary case; (2) those with a case or death from tuberculous meningitis; (3) those where the primary case was discovered at death. The public-health nurse and tuberculosis clinician are the first line of attack. Frequent change of personnel impairs the efficiency of the work. Indifference of the patient may be due to poor approach or to fear. Reluctance to be examined is suspicous. In New Haven, adult contacts are followed through their twenty-fifth year, with reëxamination at least annually. More intensive work is needed in the home. Careful histories and physical examinations should be done. Portable X-ray apparatus can also be made available, as is planned for New York City. *Summary:* A review of recent studies indicates that the adult contact is the major problem in case finding. Repeated periodical examinations are necessary. The channels of public-health education should be utilized to secure better coöperation and home visiting should be systematically developed. This demands trained and sympathetic physicians and nurses and portable X-ray facilities.—*The Adult Tuberculosis Contact, H. R. Edwards, New England J. M., October 17, 1935, ccxiii, 760.*—(*A. P.*)

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